

## MOTOR VEHICLE ENERGY RECOVERY SYSTEM

### FIELD:

The present invention relates to a system for recovering  
5 energy from the air moving past a moving vehicle when the latter  
is in motion.

### BACKGROUND:

Fuel economy in moveable vehicles such as trucks and  
10 automobiles is becoming increasingly important given the rise in  
usage of energy and its resultant increasing cost. One way of  
saving on the cost of energy is energy recovery. On motor  
vehicles there are various ways of recovering energy such as  
utilizing the heat generated from braking or the energy imparted  
15 to a vehicle when it is going downhill. Such devices have failed  
to become established in the marketplace due to their capital  
cost and complexity of installation. In addition, the amount of  
power generated is intermittent depending on the number of hills  
and the amount of braking.

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Accordingly, it is an object of the invention to provide an  
energy recovery system that is substantially continuously  
operative and can produce an amount of energy that is larger than  
conventional energy recovery systems.

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**SUMMARY OF THE INVENTION**

According to the invention there is provided a moveable vehicle energy recovery apparatus, which comprises an air capture unit having a mounting assembly for mounting the air capture unit on the moveable vehicle in a position to capture oncoming air when the moveable vehicle is in motion, a fan rotatably mounted in the air capture unit, a generator coupled to the fan and operative to rotate in response to rotation of the fan and to generate power, and an electrical conduction line for conducting power from the generator to a destination electrical load on the moveable vehicle.

Preferably, the fan has a horizontally disposed axis.

Advantageously, there may be a plurality of fans rotatably mounted in the air capture unit.

The fans may be mounted in a row on vertically disposed axes.

In another aspect of the invention there is provided a moveable vehicle having an energy recovery apparatus, which includes an air capture unit mounted on the moveable vehicle in a position to capture oncoming air when the moveable vehicle is in motion, a fan rotatably mounted in the air capture unit, a generator coupled to the fan and operative to rotate in response to rotation of the fan and to generate power and a line coupled

at one end to the generator and at another end to a destination on the moveable vehicle.

Preferably, there are a plurality of fans rotatably mounted  
5 in the air capture unit.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Further features and advantages will be apparent from the following detailed description, given by way of example, of a  
10 preferred embodiment taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a side view of a set of horizontally oriented fans and enclosure of a type suitable for use in the energy recovery  
15 system;

Fig. 2 is a front view of a set of horizontally oriented fans and enclosure of Fig. 1;

20 Fig. 3 is a side view of a truck with an installed energy recovery system installed both on a trailer and behind the grill;

Fig. 4 is a side view of an automobile with an energy recovery system installed behind the grill or under the hood;

Fig. 5 is a perspective view of a set of vertically oriented fan blades aligned in a row and an enclosure of a type suitable for use in the energy recovery system;

5 Fig. 6 is a top view of a set of vertically aligned fan blades, spaced apart and aligned in a row;

Fig. 7 is a side elevation view of an alternative fan which discharges air at an angle of more than 90 degrees relative to  
10 the direction of the incoming air; and

Fig. 8 is a schematic view of a duct used to direct incoming air to a remotely located fan and generator.

## 15 **DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS**

Referring to Figs. 1 and 2, the air capture unit 15, which is mounted on an exposed position facing upwind on a movable vehicle (see Figs. 3 and 4), consists of a square enclosure 10 having four square compartments 11. In each compartment 11 there  
20 is centrally positioned a fan 12 rigidly affixed to a rotatable shaft 13. The shaft 13 couples to a generator 14 an armature of which (not shown), rotates in response to rotation of shaft 13. Power generated by the generator 14 is taken off and used on the vehicle to reduce fuel consumption.

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Referring to Fig. 3, a truck 16 has the air capture unit 15 mounted either on the front of a trailer (not shown) carried by

the truck **16** where it can intercept oncoming wind **20** and **21** or in the front of the truck **16** behind the grill (not shown) facing wind **23**. On an automobile **33** the air capture unit **15** is mounted either behind the grill **24** or under the hood where it is provided with induction scoops (not shown) in order to channel the oncoming wind into the unit **15**.

Referring to Fig. **5** a set of fans **27** are made up of vertically oriented fan blades **30** are mounted in a row on rotatable rods **28** in rectangular enclosure **29**. The enclosure **29** is combined with three other similar enclosures **29** to make an air capture unit **31**. Referring to Fig. **6**, four air capture units **31** are mounted together spaced apart as shown. Each unit **31** has a plurality of induction scoops **36** to intercept oncoming air into the unit **31** and a plurality of internal air deflectors **34** to block air from hitting both sides of each fan **27**. Air leaves the unit through the end wall **26**, which is permeable.

In operation, with truck **16** or automobile **33** in motion, oncoming air enters the air capture unit **15** or **31** and causes the fans **12** or **27** to rotate. The rotation of the fans is coupled to a generator **14** and causes the generator **14** to rotate. Rotation of the generator generates power, which is taken off and used by the vehicle. Obviously, there are many different fan designs which could work. Additionally, by combining a greater number of fans **12** or **27** into a compartment **11** or enclosure **29** a greater

amount of power will be generated for a given wind velocity. It is also obvious that the speed of rotation of the fans **12** and **27** will vary according to speed. The energy recovery apparatus can be used on any moveable vehicle that generates sufficient speed including boats, trains, airplanes and the like.

Referring to Fig. **7**, an alternative fan **40** takes in air at mouth **41** directs it upwardly (as seen in the drawing) where it impacts the fan blades **42** and moves counterclockwise until it is discharged out of exhaust **44** at an angle of about 120 degrees to the direction of the incoming air. The advantage of such an alternative fan **40** is that it can discharge air in a direction not in-line with the incoming air that may be convenient given the geometry of its location.

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Referring to Fig. **8** a long duct **46** receives incoming air at its mouth **48** which it directs to a remotely located fan **50**. Fan **50** drives a generator **52**. Using such ducting one can locate the fan and generator at the most convenient location on the vehicle. One can also use multiple ducts to increase the volume of air received in order to increase the fan speed and hence the power generated by the generator **52**.

Accordingly, while this invention has been described with reference to illustrative embodiments, this description is not intended to be construed in a limiting sense. Various modifications of the illustrative embodiments, as well as other

embodiments of the invention, will be apparent to persons skilled in the art upon reference to this description. It is therefore contemplated that the appended claims will cover any such modifications or embodiments as fall within the true scope of the  
5 invention.